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A Post-Graduate Lecture

ON

CORNEAL ULCERS AND THEIR TREATMENT

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CORNEAL ULCERS AND THEIR TREATMENT.

GENTLEMEN,—One of the commonest forms of disease met with among ophthalmic out-patients is that of ulceration of the cornea, but despite the frequency with which it occurs it should never be lightly regarded inasmuch as it constitutes a most fertile source of diminution of vision among the poorer classes. Ulcers of the cornea, speaking generally, are an indication of malnutrition ; that is to say, the patients, both children and adults, are either suffering from the effects of overwork and under-feeding or they are markedly anæmic from some other cause. It is this depression of vitality which explains the occurrence of ulceration of the cornea after certain of the exanthemata, such as measles, scarlet fever, and small-pox ; in fact, anything which lowers the general health is prone to be followed by corneal ulceration. In curious contrast, however, with the frequency of this disease among the poor is its absence among the better classes. In private practice ulcer of the cornea is a very rare affection. Sometimes, of course, it occurs, and in this connexion I recollect a well-known surgeon telling me that during his student days he read with so much assiduity for his examinations that he at length developed an ulcer on each cornea. On the other hand, traumatic ulcers of the cornea are not infrequently seen in private practice. Only recently a gentleman was sent to me with an ulcer of this kind caused by the branch of a thorn bush. He was passing through a hedge carrying his gun when the branch suddenly flew back and struck his right cornea. The ulcer soon healed and left a barely perceptible opacity. But shortly after this he came to see me one evening with the following curious history. While dressing for dinner he somehow succeeded in injuring his left eye with the sharp edge of his shirt front, which caused him much pain. On examination there was a small abrasion of his cornea. The pain, however, was soon relieved by a few instillations of

cocaine and atropine and he was able to fulfil his engagement without much discomfort.

The clinical aspects of corneal ulcers may be dealt with so far as their immediate and remote effects are concerned. Let me refer to the latter first. Inasmuch as ulceration of the cornea involves a loss of corneal tissue it necessarily follows that the process of repair must result in the formation of an opacity and the extent to which the opacity interferes with the vision mostly depends upon that part of the structure on which it is situated. If the ulceration has been marginal no loss of vision ensues, but the closer it has approached the centre—that is, the pupillary area—the greater is the interference with the sight. Sometimes it is curious to note the declension of vision associated with opacity of the cornea. A patient may come complaining of imperfect sight and on testing the vision by the distant types we find that no glass improves; then it remains for the examination with oblique illumination to reveal the cause. A faint though perfectly definite central cornea haze is found which at the time of the first examination was not apparent.

In discussing the next question—namely, that of the immediate effects of corneal ulcers—the first point to consider is the causation of the lesion, and here I think that it is quite unnecessary to embark upon an elaborate classification. The more simple one can be the better, for, after all, whatever the etiology may be the main thing is the treatment, and this, except in complicated cases, does not vary much in the majority of instances. For all practical purposes, then, corneal ulcers may be divided into (1) traumatic, (2) simple, and (3) complicated. I have assigned to the traumatic variety a distinct class inasmuch as the primary treatment which they demand differs from that of the rest. The essential detail to bear in mind with regard to traumatic ulcers is that they may be, and commonly are, infected with pathogenic micro-organisms at the time of the receipt of the injury. Clearly, therefore, it is wise to treat them antiseptically from the beginning and apply to them those principles of cleanliness such as regulate the treatment of traumatic lesions elsewhere in the body. If the ulcer has resulted from a foreign body or a scratch or from some similar cause cocaine should be instilled into the conjunctival sac and afterwards a warm chinosol solution (1 in 2000) should be douched over the eye until thorough cleansing has been secured. Atropine drops (of the strength of 2 gr. to an ounce

of water) may then be instilled and a pad of chinosol gauze applied and secured with a bandage. The drops may be used night and morning and the sac washed with chinosol solution at the same time until the eye is well. Perhaps the most serious examples of traumatic ulcer which I have seen have been those in which the cornea has been scratched by the finger nail. Infants sometimes inflict this injury upon their mothers, but in one case under my care an elderly man came to the hospital whose story was that his eye had been accidentally scratched by his landlady. On examination there was a large ulcer of the left cornea in the lower and outer quadrant, and commencing hypopion. Eserine drops ($\frac{1}{2}$ gr. to an ounce of water) were ordered, but the case was not then treated antiseptically and only hot poppy fomentations were ordered. He was told to return in two days. At that time I found that he was complaining of much pain, the ulcer was decidedly larger and partially sloughing, and the anterior chamber was full of pus. He was admitted into the hospital; I then made a small incision through the cornea from below with a Graefe's knife and evacuated the pus from the anterior chamber, hot boric acid fomentations were applied and the eserine was continued. Under this treatment improvement quickly began and in about a week's time he was able to leave the hospital with the ulcer nearly healed. The explanation of the infectivity of these cases presumably is that the nail while inflicting a wound on the corneal surface affords the opportunity to the pathogenic micro-organisms collected under its free edge to inoculate the lesion. It is evident, then, that these and other traumatic ulcers demand careful antiseptic treatment from the first in view of the trouble arising from their liability to septic infection.

Simple ulcers of the cornea may be described as those in which the ulceration is unaccompanied by any distinguishing feature, such as vascularity, hypopion, sloughing, &c. This form of ulcer is most commonly seen among weakly school-children. Perhaps the most troublesome symptom associated with it is photophobia, which, however, is very variable in degree. Sometimes the intolerance of light may be extensive; on the other hand, there may be very little or hardly any to speak of. At any rate, the size of the ulcer bears no relation to the intensity of the photophobia. In young children, for example, in whom acute blepharospasm has been present for some days, careful examination of the cornea under an anæsthetic may

disclose an ulcer not larger than the head of a pin. Again, these simple ulcers are seen in connexion with phlyctenular ophthalmia. They are generally superficial and after healing scarcely leave any opacity in the majority of cases. Their treatment is quite simple. If much photophobia be present cocaine and atropine drops may be used twice a day and the eye at the same time bathed with warm water. A shade should also be worn with a thin layer of cotton-wool under it in order to exert some pressure upon the closed upper lid, thus keeping the eye in a condition of physiological rest. Internally a tonic should be given, nothing being so efficacious as a preparation of iron; the tincture of the perchloride with glycerine answers admirably. If the photophobia be not troublesome some atropine drops (2 gr. to an ounce of water) may alone be used, and it is useful to bear in mind that their instillation should be continued until all injection of the globe has subsided. Afterwards some dilute yellow ointment may be placed in the conjunctival sac every night at bed-time as a stimulant to the processes of repair. In the majority of cases this treatment amply suffices to effect a cure. But it is useless to expect a good result if the child be permitted to attend school. All school work should be interdicted until the eye has made a good recovery.

Complicated ulcers may be divided into the sloughing, vascular, and infective varieties. Any ulcer of the cornea may pass into a sloughing condition and when this occurs the cause is due to pathogenic infection. One of the sources of such infection is stated—and repeated—in text-books to be chronic dacryocystitis; the condition, therefore, of the lacrymal passages should always be examined into in these cases. Sloughing ulcers are not infrequently seen during lactation in weakly young women, whose anæmic, underfed condition altogether unfits them for continuing the duties of nursing their offspring. In bad cases the ulcers may be multiple and both eyes may be involved, and inasmuch as the ulceration extends into the deeper layers of the cornea perforation with prolapse of the iris may supervene and add still further to the seriousness of the destructive effects of the disease.

Coming to the question of treatment I have repeatedly found that sloughing ulcers of the cornea are best treated from the first with eserine. The strength of this drug which I use is half a grain to an ounce of sterilised water and this I never exceed. With drops of such strength

no irritation is caused, while the full benefit of the drug is obtained. Practically the effect of the drops can be regulated by the frequency of their instillation. Speaking generally, two instillations a day will be found to be sufficient, but if more are considered to be advisable these can be administered without fear of pain or irritation being induced. I shall refer to this use of eserine more fully later. Again, heat in the form of hot fomentations is absolutely needful; nothing so effectually relieves the oftentimes acute pain accompanying these ulcers. The cornea likes warmth. A large pad of chinosol gauze dipped into boiling water and wrung dry should be placed over the lids of the affected eye and the applications continued for half an hour or more twice or thrice a day. A few words may now be said regarding hot fomentations. It should be remembered that belladonna in this form is best avoided. For example, belladonna fomentations are contraindicated when the eye is under the influence of eserine, for the one drug would counteract or neutralise the effects of the other. Again, it is inexpedient to use belladonna when the eye is under the influence of atropine, for the combination of the two is apt to cause atropine irritation. Lastly, a fomentation is not usually intended for the application of a drug, but as a means for the employment of heat; hence if any drug be used it is best to employ some antiseptic, as chinosol, by which the conjunctival sac will be kept as far as possible in an aseptic condition and the repair of the ulcer more directly promoted. In addition to the local treatment the patient should have good food in abundance, as well as a preparation, say, of quinine and iron, while it is very needful to remember that in bad cases occurring in connexion with lactation the weaning of the infant becomes an essential element of treatment.

A vascular ulcer is distinguished by a leash of vessels, presumably of repair, running from the conjunctival margin across the cornea to the lesion. These vessels while coursing over the cornea naturally disturb the nutrition of the epithelium beneath them and thus opacity is often the result. The opacity so remaining has been compared to a "snail track," the mark, that is, which a common or garden snail leaves in its course while moving about at night. These ulcers are generally chronic and in earlier days were regarded as very intractable to treatment. All local treatment not infrequently failed to cure them, and then there was only one other method left, which, however, seldom failed to be success-

ful. I allude to the use of a seton. But it is now some years since I resorted to this practice. Indeed, the mere idea of such a method is repulsive in these days of aseptic non-suppurating wounds. How can any surgeon whose faith is firm in Listerism voluntarily bring himself to inflict a wound with the deliberate intention of providing for its continuous suppuration. Still, such is the effect of a seton. The more loathsome-looking the septic silk of which it was composed became and the freer it was bathed in pus the more efficient was its action supposed to be. Every time that the surgeon dragged the seton to and fro in its fistulous track, as was the custom, he introduced a fresh supply of septic matter and thus added to the suppuration. I do not know to what extent this loathsome method is still resorted to, but for the credit of our art the hope may be expressed that it has metaphorically been relegated to the lumber room of obsolete remedies where it may be allowed to remain and be forgotten. Vascular ulcers, as I have for some years repeatedly proved, are readily amenable to treatment with eserine. A short time after I first adopted this method I was asked by the then medical superintendent of one of the metropolitan Poor-law infirmaries to see a case of vascular ulcer in one of the patients under his care. The ulcer had resisted treatment for a long time and all kinds of local remedies had been tried but had failed. Nevertheless, a seton had not been used nor had eserine. However, I recommended the latter and in a short time afterwards I heard that the case was well.

The infective ulcer of the cornea, commonly called the serpiginous, is a form of ulceration which tends to spread over the surface of that structure with an infective edge suggestive of the course pursued by phagedæna of the skin which used to be seen not infrequently some years ago. The disease is very destructive and in the majority of cases calls for vigorous treatment. Commonly it has a crescentic outline and begins at the corneal margin. The corneal tissue surrounding the ulcer may or may not appear infiltrated. The progress of the disease is strongly suggestive of its micro-organic origin and it is now believed to be due to a specific diplococcus. Much pain, photophobia, and injection of the globe usually accompany this form of ulceration, and the patients are mostly men of middle age. In advanced cases hypopion, perforation, and much destruction of the corneal tissue may ensue, leaving the patient with an irretrievably damaged organ. If seen

early the disease may be arrested by treatment and a good result obtained before much damage has been done. Recognising therefore its infective nature the best plan is to treat the ulcer antiseptically from the first. Cocaine having been instilled a warm chinosol solution (1 in 2000) should be allowed to play over the surface of the ulcer and the conjunctival sac thoroughly irrigated. Then eserine drops should be instilled and afterwards finely pulverised iodoform may be dusted over the corneal surface. Lastly, some chinosol ointment should be smeared over the margins of the closed lids and a pad of chinosol gauze and a bandage applied. If after trial these measures fail and it is evident that the ulcer is spreading then the following plan must be resorted to. The eye having been cocaineised a drop of a solution of fluorescein must be instilled; the area of the ulceration will then appear as a bright green surface. To the surface thus delineated the actual cautery must be applied, the margins being especially dealt with. When healing satisfactorily follows this treatment much opacity of course remains. Among out-patients these infective ulcers are, perhaps, the least common, but they are said to occur with frequency among agricultural labourers, especially during harvest time.

In the foregoing remarks it will have been observed that I have more especially referred to two drugs—namely, chinosol and eserine—and about each of these I now propose to add some further details. With regard to chinosol, concerning the advantages of which I have been repeatedly asked, I believe it to be the best antiseptic agent which is now in the market, and the longer I use it the more I prefer it and the closer does it seem to me to fulfil the requirements of an ideal preparation of the kind. There are certain reasons for doubting whether in ophthalmic surgery the principles of antisepticism are followed in the present day to the extent which their importance demands, and it is probable that the want of precision in this regard is partly due to the fact that among the multiplicity of antiseptic agents there is none which has actually found general favour with ophthalmic surgeons. The perchloride of mercury, carbolic acid, boric acid, each has its drawbacks. Each is undoubtedly useful in its way, but neither the one nor the other has ever excited sufficient enthusiasm to cause thorough antiseptic principles to prevail in the domain of ophthalmology. The importance of this matter I believe to be such that I hold sympathetic ophthalmia would be an impossible complication

in eye surgery were a wound of the ciliary region to be treated from the first with every antiseptic precaution. In fulfilment of this belief I have treated within the past year several severe wounds in the dangerous zone, and in each case the eye made an excellent recovery. The results I attributed to the systematic antisepticism practised by means of chinolol. The chemical name of this drug is potassium oxyquinoline sulphonate and one of its chief advantages is the potency of its germicidal action—a fact which has been incontestably proved by bacteriological investigation. In addition, it is freely soluble in water and thus is handy for use. Moreover, it is non-caustic, does not injure the skin of the hands, does not coagulate albumin, and is non-hygroscopic. Again, it is one of the most economical preparations in the market, for owing to its potency only weak solutions of the drug are necessary. Mixed with 1 in 20 of boric acid it forms an admirable antiseptic ointment. It might, perhaps, seem that in saying all this I am praising chinolol inordinately. The fact, however, is that a lengthened experience has taught me that it is an excellent preparation, possessing advantages which in time must commend it to every operating surgeon. With respect to eserine, there is some unanimity of opinion among the authors of modern text-books on ophthalmic surgery that the drug should be avoided in the treatment of corneal ulcers. But my experience, as will have been gathered, does not accord with that view. On the other hand, I believe that the feeling which prevails against eserine in this connexion has arisen in consequence of misconception regarding its use. The great point to remember is to use it in a weak solution. The evil repute of the drug has been mainly gained by employing solutions of greater strength than were necessary. Formerly eserine drops of the strength of four grains to an ounce of water used frequently to be prescribed, and then troublesome symptoms were nearly always induced. But it is seldom, if ever, necessary to resort to a higher strength than half-a-grain to an ounce solution, and for continuous instillation in cases of chronic glaucoma even a less strength than this may be satisfactorily employed. Experience has fully demonstrated that there are certain forms of ulceration of the cornea which atropine fails to benefit but which, on the other hand, readily yield to eserine. To define what these particular forms are is a question which has been repeatedly asked in my out-patient room and the answer may here be given as follows: all

sloughing, infective and vascular ulcers are best treated with eserine as well as, of course, those situated at the corneal margin at which perforation is threatening. This may be regarded as a broad rule for guidance, but there remain other cases concerning which no rule can be expressed in words. I have in my mind those cases of simple ulcer in which atropine has been used and apparently failed. In many of such I have found eserine to act like a charm, the injection of the globe quickly clearing up in consequence and the ulcer rapidly beginning to show improvement. A typical case may here be mentioned. A short time ago a man wearing a shade was led in to my out-patient room by his wife. The history was that he had been under treatment at an ophthalmic hospital for five weeks. There was a superficial central ulcer of each cornea with photophobia and some injection of the globes. The pupils were widely dilated from atropine. This seemed to be a case in which eserine was clearly indicated. Accordingly eserine drops ($\frac{1}{2}$ gr. to an ounce of water) were ordered to be instilled twice a day. At the end of the week when the patient again presented himself the improvement was very manifest. Two days after using the drops the patient discarded the shade and the photophobia had gone as well as the injection of the globes. Before the end of another week he had returned to his work. Undoubtedly in cases where photophobia is troublesome eserine is of service by contracting the pupil and cutting off light to the eye, while atropine increases the trouble by dilating the pupil, thus placing the patient with his damaged cornea in a helpless condition in the presence of light beyond a low degree. It is quite possible that the utility of eserine in the treatment of corneal ulcers is partly due to the fact that the drug reduces the tension of the globe. This is only a reasonable assumption when we recollect that atropine tends to raise the tension and that an eye in which increased tension has occurred is not one in which healthy nutrition is likely to be present. By lowering the tension, then, in these cases just the difference may be made in securing the establishment of those nutritional changes necessary for the complete repair of the ulcers.

